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UNITED STATES
DEPARTMENT OF AGRICULTURE

BUREAU OF
ENTOMOLOGY AND PLANT QUARANTINE
NEWS LETTER

VOLUME VIII No. 7

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DR. STRONG DIES IN ARIZONA

In announcing the death of the Chief, which occurred on June 2, Secretary Wickard said: "In the death of Lee Strong the Department has lost one of its best Bureau chiefs. He was a natural leader, a good administrator, and a fine servant of the people of the United States."

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR MAY 1941

Vol. VIII, No. 7 (Not for publication) July 1, 1941

ADMINISTRATION

Uniform Style for Correspondence

The Department proposes to issue a style manual establishing uniform style and procedure for all Departmental correspondence. It is anticipated that the style prescribed in the new manual will be effective on August 15. Prior to that and as soon as copies are available appropriate instructions will be issued by the Bureau. Limited copies of the style manual are available and pertinent features are being given advance distribution to divisional offices.

The new style is being used in some of the correspondence issuing from the administrative offices. You may be interested in observing changes in procedure which will be used when the new style becomes effective. Those who may desire may now begin preparing their correspondence in accordance with the new style.

Bureau Appropriations

The report of the Conference Committee on the bill providing appropriations to the Department for the fiscal year 1942, released under date of June 17, included the following on items providing appropriations to the Bureau, in disagreement between the House and the Senate:

	Senate Bill compared with House Bill	Conference Report compared with House Bill
Mexican fruitfly control---------	$ 7,500	---
Citrus canker eradication--------	13,485	$ 13,485
Dutch elm disease eradication----	50,000	50,000
European corn borer control------	17,939	--
Barberry eradication-------------	62,500	20,000
Bee culture----------------------	33,000	33,000
Insecticide and fungicide investigations-----------------	5,000	5,000
Foreign plant quarantines--------	20,000	10,000

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No other items relating to Bureau appropriation were in disagreement between the House and Senate. The amounts provided for items not in disagreement are the same as those appropriated in the act for the current fiscal year. This also applies to the following items which were in disagreement: Mexican fruitfly control, citrus canker eradication, and bee culture. The amount available for Dutch elm disease eradication is $50,000 less than the current fiscal year, that for European corn borer control, $17,939 less. The amounts available for the item barberry eradication for 1942 is increased by $20,000, that for insecticide and fungicide investigations by $5,000, that for foreign plant quarantines by $10,000.

The conference report will provide an increase of $83,332 over the amount available for the current fiscal year to the Bureau of Entomology and Plant Quarantine for work on white pine blister rust control. The amount provided to Forest Service for white pine blister rust control is increased by $41,668. The amount of $115,000 provided for the Department of the Interior is an increase in the funds available to that Department for work on this disease.

BUREAU EMPLOYEES CALLED TO THE COLORS OR TRANSFERRED TO SPECIAL NATIONAL DEFENSE ASSIGNMENTS

The current issue of the "News Letter" includes a new section which it is proposed to continue in subsequent numbers as material is available. This section will contain the names of employees of the Bureau who have enlisted in or been called to perform military service or assigned by transfer or loan to other units of the Government to carry out special activities associated with National Defense. It is desired to give the designation and unit of the Bureau to which the employee was assigned at the time of the change and where practicable a brief statement of the new assignment. Indication of accompanying personnel adjustment within the Bureau may be added.

The material included in this issue was prepared on short notice and without giving field Division leaders opportunity to contribute. It is hoped that the list included under this heading in the various issues of the "News Letter" will make a complete record of all full-time employees, including collaborators continuously engaged in work of the Bureau, such as those concerned with the enforcement of Federal plant quarantines. It is also hoped that it can be made complete for seasonal employees working under appointment. All are requested to aid in accomplishing this by calling attention to omissions through regular channels.

The Selective Training and Service Act and procedures established under it provides for the restoration of employees to positions of equal responsibility and salary when training and service is completed. Insofar as is practicable this policy is administratively extended by the Bureau to reserve officers called for active duty. In the opinion of the Comptroller General, as indicated in Administrative Memorandum EQ-305 (2d Supplement), it is not possible to definitely extend this policy to employees who may voluntarily enter military service. Insofar as is practicable, however, the Bureau desires to extend to those who resign and enlist in the military service the same consideration when their military service is concluded.

Adams, John H., Jr., Asst. Pl. Quar. Insp. (PBW), Capt., O.R.C., 25th Inf., Ft. Huachuca, Ariz., called to active duty Dec. 26, 1940.

Allison, Glenn R., Agt., Pl. Dis. Cont. (BRC), First Lt., O.R.C., Camp Livingston, La., called to active duty May 12, 1941.

Babers, Frank H., Assoc. Biochemist, Cont. Inv., First Lt., 260th C.A. (AA), D. C. Natl. G., called to active duty Jan. 6, 1941.

Barnett, Frank L., Agt., Dom. Pl. Quar. (WFB), 155th Inf., Natl. G., Camp Blanding, Fla., called to active duty Nov. 25, 1940.

Biederman, Fred R., Agt., Dom. Pl. Quar. (GRASSHOPPER CONT.), entered military service Aug. 18, 1940.

Bofill, Miguel A., Collab., For. Pl. Quar., Master Sgt., Inf., Natl. G., called to active duty Oct. 16, 1940.

Bridges, Lester, Jr. Pl. Quar. Insp., Dom. Pl. Quar. (SPW), 2nd Lt., 24th Inf., U.S.A., Ft. Benning, Ga., called to active duty May 16, 1940.

Bunn, Ralph W., Asst. Ent., Dom. Pl. Quar. (WFB), Capt., Sanit. C. Resv., Camp Polk, La., called to active duty May 20, 1941.

Burgess, Emory D., Asst. Ent., Frt. Ins., First Lt., Sanit. C. Resv., Camp Claiborne, La., called to active duty Apr. 10, 1941.

Caperton, Edward F., Jr., Agt., Cotton Ins., on furlough, enlisted in military service.

Chang, Dai You, Asst. Clk., Frt. fly Inv., Sgt., Natl. G., called to active duty Oct. 16, 1940.

Dorst, Howard E., Asst. Ent., Truck Cr. Ins., Capt., Sanit. C., U.S.A., Camp Croft, S. C., called to active duty Apr. 7, 1941.

Douglass, W. J., Asst. Pl. Quar. Insp., For. Pl. Quar., Maj., O.R.C., called to active duty.

Eagan, Francis T., Jr. Pl. Quar. Insp., Dom. Pl. Quar. (WFB), O.R.C., U. S. Marine Corps, Parris Island, S. C., called to active duty Aug. 1, 1940.

Ernest, Paul S., Agt., Dom. Pl. Quar. (GRASSHOPPER CONT.), inducted, Select. Serv., Apr. 10, 1941.

Fate, Leston R., Asst. Pl. Path., Jap. Beetle Cont., (DED), O.R.C., Natl. G., called to active duty Jan. 6, 1941.

Furr, G. L., Jr. Pl. Quar. Insp., For. Pl. Quar., Capt., O.R.C., called to active duty.

Graham, John G., Agt., Cotton Ins., on furlough, inducted, Selec. Serv.

Greenberg, Louis, Asst. Clk., For. Pl. Quar., inducted, Select. Serv., March 13, 1941.

Hill, Samuel O., Asst. Ent., Frt. Ins., First Lt., Sanit. C. Resv., U. S. A., Camp Livingston, La., called to active duty Apr. 25, 1941.

Kagan, Abbott, Jr. Fld. Aide, Cotton Ins., on furlough, enlisted in military service.

Lamansky, K. W., Under Fld. Aide, Frt. Ins., inducted, Select. Serv.

Landers, Horace J., Airplane Obsvr., Jap. Beetle Cont. (DED), inducted, Selec. Serv., Feb. 3, 1941.

Lieux, Davidson B., Field Aide, Truck C. Ins., inducted, Select. Serv., Ft. Benning, Ga., May 13, 1941.

Mason, Horatio C., Assoc. Ent., Truck C. Ins., Capt., O.R.C., Infantry, Ft. Benning, Ga., called to active duty Apr. 1, 1941.

Matheny, Gallais E., Assoc. Path., Pl. Dis. Cont. (BE), Capt. U. S. Marine Corps, Washington, D. C., called to active duty Oct. 15, 1940.

McAlister, Harold J., Sr. Field Asst., Frt. Ins., First Lt., O.R.C., U. S. A., called to active duty May 5, 1941.

Menzies, Perry P., Agt., Cotton Ins., on furlough, enlisted in military service.

Nerney, Norbert J., Agt., C. & For. Ins., entered military service Feb. 18, 1941.

Noble, W. B., Assoc. Ent., C. & F. Ins., First Lt., U. S. A., Presidio, Tex., San Francisco, Calif., called to active duty June 25, 1941.

Parnell, C. L., Jr. Pl. Quar. Insp., For. Pl. Quar., First Lt., O.R.C., U. S. A., called to active duty.

Post, Claude E., Jr. Pl. Quar. Insp., For. Pl. Quar., First Lt., O.R.C., U. S. A., called to active duty Nov. 7, 1940.

Randolph, Tom B., Jr. Fld. Aide, Cotton Ins., on furlough, inducted, Selec. Serv.

Sigsbee, Harold J., Agt., Jap. Beetle Cont. (DED), inducted, Selec. Serv., Apr. 29, 1941.

Smith, J. D., Jr. Pl. Quar. Insp., For. Pl. Quar., Capt., O.R.C., U. S. A., called to active duty.

Spencer, Herbert, Ent., Frt. Ins., Major, Sanit. C. Resv., Camp Shelby, Miss., called to active duty March 20, 1941.

Tolosa, Pedro, Collab., For. Pl. Quar., First Lt., Natl. G., called to active duty Oct. 16, 1940.

Wall, Harry M., Jr. Clk. Stenog., Frt. Ins., inducted, Selec. Serv., March 18, 1941.

FRUIT INSECT INVESTIGATIONS

Driving hibernating curculios out of trash.--In connection with hibernation studies of the plum curculio, such as a determination of the percentage of mortality during the winter, it becomes necessary to recover all live adults from hibernating materials. At the Fort Valley, Ga., laboratory a simple and inexpensive apparatus has been constructed which has proved to be very effective for recovering all live plum curculio adults from leaves, woods mold, pine needles, grasses, debris, and other hibernating materials, and which could no doubt be used for recovering other insects from materials in which they pass the winter. This apparatus consists of a sheet of tin 9 feet long and 2 feet wide, with a 1-inch flange along each long side. The tin is placed on four tile pipes 2 feet long and 6 inches in diameter. The hibernating material is placed in a thin layer on top of the tin and slow fires maintained underneath. When the material gradually warms up, all live beetles crawl out and are easily collected as the material is moved around with a stick.

Poisoning small darkling beetles.--A heavy infestation of Blapstinus rufipes Casey on a fruit ranch in March and April offered an opportunity for a controlled poisoning experiment, which was carried out by Dwight F. Barnes and Charles K. Fisher, of the Fresno, Calif., laboratory. The infested field was covered with a heavy growth of filaree, chickweed, shepherd's purse, bur-clover, and other species. Four plots, each 10 feet square, were fenced in by vertical barriers of galvanized sheet iron. On April 7 three plots were treated with poison at the rate of 25 pounds per acre. Samples of the population were taken by means of a circular cutter which was forced through the plant cover and into the soil, thereby confining all the beetles in an area of 1 square foot. Rain delayed sampling, which was done on April 14. The results follow.

Plot No.	Treatment	Samples	Beetles	
			Total	Dead
		Number	Number	Percent
1--------	Control	2	13	0
2---------	Sodium fluosilicate, middlings--------------	5	46	83
3---------	Sodium arsenite, bran---	5	20	75
4---------	Sodium fluosilicate, middlings, ground figs	4	42	81

The sodium fluosilicate was used at the rate of 5½ pounds, and the liquid sodium arsenite at the rate of ½ gallon, per 100 pounds of carrier. Equal parts by weight of middlings and ground figs were used in the formula applied to plot 4. Water was added to moisten the mixtures. Applications were repeated in new locations, but the population in the area declined so rapidly that the results were indefinite.

Research on *Parlatoria chinensis* scale.--This introduced scale, found infesting certain plants in part of the city of St. Louis, Mo., in 1940, is not known to occur elsewhere in the United States, and the information available in the literature from other countries in which it is known to occur is very meager. The Bureau has undertaken, therefore, to cooperate with State agencies in an investigation of the host-plant relationships of the scale, its development, the factors that promote natural spread, its actual status as a pest, and measures for control. To provide funds for this, the work at the St. Joseph, Mo., laboratory has been suspended and Howard Baker, formerly in charge of the laboratory, has been assigned to this investigation, in cooperation with the Missouri Department of Agriculture and the Department of Entomology of the University of Missouri. The post office address for the work on *P. chinensis* (Marl.) is 5201 Oakland Avenue, St. Louis, Mo., Howard Baker, in charge.

Control of Hall's scale.--Hall's scale (*Lepidosaphes halli* Green) made its reappearance in 1940 in an almond orchard at Chico, Calif. It is thought that the original infestation in the Plant introduction Gardens at Chico was cleaned up and that later the infestation in the nearby almond ranch built up to the point of spread and reinfested the gardens. The Bureau has received an allotment from appropriations provided under the general authorization for the control of incipient and emergency outbreaks of insect pests and plant diseases to attempt the eradication of the present infestation. This effort on the part of the Bureau is in cooperation with the California State Department of Agriculture, the Bureau of Plant Industry of the U. S. Department of Agriculture, and the owners of infested properties. The work is under the joint supervision of B. L. Boyden, representing the Bureau, and David B. Mackie, representing the California State Department of Agriculture, Sacramento, Calif. Mr. Boyden remains in charge of the Bureau laboratory at Whittier, Calif. The headquarters for the control work on Hall's scale is Chico, Calif., the address being 336 Broadway, E. H. Fosen, in chargo.

MEXICAN FRUITFLY CONTROL

Conditions in lower Rio Grande Valley.--The citrus-fruit-harvesting season in the area regulated under Quarantine 64 closed on May 31. On that date very little fruit remained to be harvested. On a few properties where excessive rains had caused the groves to be under water for several weeks there remained a small amount of grapefruit, but this fruit was disposed of without undue difficulty. Larvae of *Anastrepha ludens* Loew were found on 23 properties in May. At the close of the season larval infestations had been found on 552 properties. During the same period last year 578 infestations were found. The fly population throughout this season has been relatively low. Only 943 flies had been trapped throughout the month of May, whereas on May 31, 1940, 5,031 flies had been taken.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Ecology of Hypera brunneipennis on sourclover and alfalfa.--W. C. McDuffie, Yuma, Ariz., reports that detailed ecological studies of *H. brunneipennis* (Boh.) in Yuma Valley were conducted last winter and spring in alfalfa and volunteer sourclover (*Melilotus indica*) in order to determine the comparative suitability of these hosts. Initial samplings early in January showed adult oviposition was well under way, but that activity was so recent that the accumulation of eggs was small. Eggs were considerably more numerous in sourclover than in alfalfa, owing to a much greater adult concentration and to shorter growth. Under these conditions hatching in sourclover was also more advanced, but larvae were still scarce and all in the first stage. Throughout January oviposition steadily increased, and the peak of egg abundance in fields occurred late in January and early in February. Oviposition gradually declined to insignificance by the early part of April. Larvae steadily increased in abundance during January, but the peak occurred late in February, indicating the incubation period in the field during these months to be approximately 1 month. This was substantiated by incubation studies in the insectary, where temperatures closely approximated those in the field. Development was relatively slow throughout January, very few larvae attaining the third and fourth stages. But with gradually increasing temperatures during February, development became accelerated and by the end of the month, third- and fourth-stage larvae were as abundant as the smaller stages and a few had matured and spun cocoons. The duration of the larval stage during this period was approximately 5 weeks. The proportion of the larval population that attained the third and fourth stages, as well as the cocoon stage, was much greater on sourclover than on alfalfa, where, for unknown reasons, survival was very poor for the second season in succession. The peak of cocoon abundance in sourclover occurred late in March, approximately 1 month after the peak larval abundance. This indicated the duration of the larval stage to be about 1 month during the latter part of February and March. New adults began emerging early in March, but the period of greatest emergence was from late in March to late in April. The peak of new adult population, viz., 90 per square foot, in sourclover, occurred during mid-April. This, however, was not the maximum population produced, as, beginning early in April, adults were constantly leaving fields in search of aestivating places and sufficient cocoons and larvae were still present to produce a nearly constant number of adults. Taking these factors and known mortality of immature stages into account, it is believed that the total adult production per square foot in sourclover this season was at least 80 percent of the potential that had been indicated by a peak larval population of 200 per square foot. This population arose from a parent adult population of only about 1 per square foot. On the other hand, larval mortality in alfalfa was so nearly complete that the production of adults no more than replaced the parent population of about 0.25 per square foot. The fact that this has occurred in both 1940 and 1941, indicates sourclover to be a far more favorable host than alfalfa.

Proportions of June beetle species collected in Wisconsin.--T. R. Chamberlin and Lee Seaton report that night collection of beetles from host plants was hindered during May by frequent heavy thundershowers and strong winds, many of which occurred just before or just after collections were begun. Some of the data recorded therefore were obtained in shorter periods than the customary 2 to 3 hours. The collections were interesting in showing the differences in the predominance of certain species in various areas. The following table shows the percentage of total beetles represented by the commoner species in the different areas.

Locality	Date (May)	Percentage of beetles						
		P. rugosa	P. hirticula	P. fusca	P. ilicis	P. prunina	P. nitida	Total
Dane-------	5	44.0	27.7	22.8	--	--	--	94.5
Lamont---	6	0	20.4	71.2	--	--	--	91.6
Do-------	20	0	78.1	8.2	--	--	--	86.3
Do-------	27	0	83.3	11.5	--	--	--	94.8
Leeds------	13	6.9	2.1	88.2	--	--	2.1	98.3
Poybette---	19	42.7	5.9	38.4	--	8.1	--	95.2
Linden-----	21	.4	81.6	11.1	2.7	--	--	95.8
Do-------	27	.9	86.1	8.1	3.3	--	--	98.4

JAPANESE BEETLE CONTROL

Airplane distribution of milky-disease spores abandoned.--In cooperation with the Division of Fruit Insect Investigations and the Maryland Department of Horticulture, preliminary discussions had been held concerning the feasibility of dropping in pellet form from the Division's autogiro the chalk-talc mixture containing the milky disease of Japanese beetle grubs. Legal difficulties were encountered that forced the abandonment of this procedure. As reported in the Baltimore Evening Sun, "the Attorney General has held that the State entomologist cannot use an airplane to attack the beetles by scattering dust against them. The official ruling was made by Attorney General William C. Walsh and Robert E. Clapp,, Jr., one of his aides, in answer to an inquiry from Ernest N. Cory, State entomologist. Mr. Cory revealed that the United States Department of

Agriculture had made available an autogiro for use in spreading certain dusts that would tend to destroy the ubiquitous Japanese beetle grubs. Whether property owners could raise any objection, and whether permission had to be obtained from each person on whose property dust might settle from the air, were among the questions posed by Mr. Cory. Despite the fact that the State may require destruction of diseased plants and trees to prevent spread of plant diseases and even destroy them by their own agencies if owners refuse, the legal advisers of Maryland still held that use of an airplane to scatter dust was improper. Even that power, the ruling pointed out, would hardly authorize the indiscriminate scattering of some preventative in such places where it couldspread to where no such insects are present. Trespass complaints might result, the legal opinion said. Moreover, it declared, another section of Maryland law 'Prohibits any aeronaut or passenger while in flight from dropping any object except loose water or ballast.'"

Preparations for refrigerator-car fumigation.--At a meeting of several staff members of the Division with Pennsylvania Railroad Company officials at Wilmington, Del., on May 5, procedures to be followed in handling Japanese beetle certification of fruits and vegetables moving from the heavily infested area this summer were discussed. The only changes this year are the establishment of a new fumigation point at Pitcairn, near Pittsburgh, Pa., and the fumigation of empties at Clayton, Del. Methyl bromide will be used from 1-pound cans at every point except Edge Moor yards, near Wilmington, Del. At this point the company has a supply of 38 tanks of the fumigant still to be used. When the tank supply is exhausted cans will be used there too. Preparations were made by the treating section in May for starting fumigation activities. Gas masks to be assigned to the various fumigation points were checked and assembled ready for distribution. The Edge Moor yards were visited on May 22 and their fumigation equipment checked. A locking device has been developed by a commercial concern to prevent the clamp on the can applicator from springing back and releasing the methyl bromide on the operator. This was brought to the attention of the railroad officials as a possible improvement in their equipment. The manufacture of ventilator screens by the company had been started at the time of the visit. A meeting was also held during the month with banana company officials in the New York City area to discuss the certification procedure for refrigerator cars brought over from New Jersey.

Bermuda continues beetle-control efforts.--Advices have been received by the Bureau from J. M. Waterston, plant pathologist of the Bermuda Department of Agriculture, to the effect that his department intends to continue its efforts to keep Bermuda free from the Japanese beetle as long as possible. The same bylaws as were in effect in 1940 will govern the importation of plant material into the Colony during the period June 1 to September 30. All plants, fresh unfrozen vegetables, and commercial shipments of cut flowers imported from the United States during this period must meet the requirements of the Federal and State Japanese beetle quarantine regulations and must be accompanied by certificates to this effect issued by an authorized official of the U. S. Department of Agriculture. Importations are prohibited of sweetpotatoes, raw carrots, Indian corn or maize, and banana fruit unless unaccompanied by wrapping, cover, or packing of any kind. Masters of steamships and aircraft have been requested by the Bermuda officials to give advance notification by radio if live beetles are discovered on board en route to Bermuda.

Japanese beetle activities in Canada.--From the April issue of the Canadian Division of Entomology News Letter it is learned that "On April 23-24, Mr. McLaine visited the Toronto office, and Niagara Falls, where spraying operations for the control of the Japanese beetle were under way. This work started on April 23 and was completed on April 29. During this time over 5,000 pounds of arsenate of lead were applied to 10½ acres in Queen Victoria Park and adjacent to the Falls. The United States Bureau of Entomology and Plant Quarantine kindly detailed one of their experienced field men, Mr. Cassel, to supervise the control work, and the Niagara Falls Park Commission, through the courtesy of the general manager, provided nine men and their power sprayer. The Ontario Department of Agriculture also shared the expense of the control work. * * * F. J. Hudson (of the London, Ontario, station) * * * on April 24 went to Niagara Falls and made photographic slides and colour movies of the Japanese beetle control work that was being done there."

Substitute for Holland bulbs.--Large quantities of small potted azalea rooted cuttings were certified during the month in northern New Jersey. One nursery shipped 180,000 of this size. Shortages of some types of azaleas are reported, as this plant in many instances appears to have taken the place of Holland bulbs that cannot be imported because of the war. The large types of azaleas are being treated for Japanese beetle and shipped extensively. A number of establishments in the North Jersey area are complying with the requirements for maintaining certified greenhouses this summer so that a greater number of azaleas can be produced for next fall and spring. There are approximately 78 certified greenhouses to scout in this section. A classified nursery in southern New Jersey is experimenting with Florida-grown azaleas.

North Carolina beetle-control activities.--During the month the Division's representative at Asheville, N. C., working in cooperation with the Division of Fruit Insect Investigations and the North Carolina Department of Agriculture, re-treated 70 acres of farm land with the chalk-talc mixture containing spores of the milky disease of Japanese beetle grubs. The dust was spotted in the field in rows 5 feet apart and at 5-foot intervals in the row. When this land was first treated, the spore dust was distributed at 10-foot by 10-foot intervals. The re-treated plot is near the railroad stockyard. After re-treating was completed, several grub surveys were made, a few prepupae and many larvae being collected. Twenty traps were set on the infested estate and on the nearby railroad property to determine the first adult emergence. At the Asheville post office, 900 traps were assembled. Seven hundred of these were in readiness for placement in the fields and residential sections of Asheville and vicinity.

Japanese beetle fumigation activities.--A nursery at Narberth, Pa., requested several varieties of plants tested with methyl bromide. These were fumigated at the White Horse, N. J., district office and returned to Narberth for observation. The main varieties in which this nurseryman is interested are vinca, pachysandra, and ivy. All of these were in the soft-growing stage and none showed any ill effects from the treatment. One Long Island establishment treated a plot of 4,700 square feet with carbon disulfide and constructed a metal screened frame over it. This plot will be used for growing certified azaleas. The estimated cost of this screened frame is $1,000. About 15,000 certified azaleas in 3-inch pots were set in the frame. The grower figures that it will cost approximately 8 cents per pot for certification; however, he claims that certified plants bring about 25 cents more each in the West than those which can be obtained locally.

New York City inspectors busy with clearance sales.--Most of the inspection calls in New York City during the latter half of the month were necessary because several large department stores were running clearance sales of plant material. Orders received from all parts of the country resulted in requests for daily inspection at one of the larger stores. Japanese beetle inspection work continued heavy during the first part of the month but tapered off considerably in the latter half, owing to the regular seasonal lull, together with the continued dry spell which made the digging of balled nursery stock impractical. One nursery on Long Island was forced to cancel a carload shipment because it was impossible to ball the stock owing to dry soil.

Early beetle emergence.--Earliest official reports of adult Japanese beetle emergence were received from the Norfolk, Va., Philadelphia, Pa., and Salisbury, Md., areas late in the month. The first beetle found in the Norfolk area this year was trapped on May 27 in traps set on the Army Base Golf Course. These traps, 12 in number, are being tended by men from the Norfolk office for I. M. Hawley, of the Japanese beetle research staff. On May 28, 5 beetles were found on sorghum on a farm near Hatboro, Pa. The following day, 2 beetles were found in Cape Charles, Va. A large nursery in the Norfolk area has set 12 privately owned traps in the section in which beetles were found by scouts of this Division last summer.

Japanese beetle trapping.--In addition to the number of traps placed in cities in the various States in April, traps were placed in 46 cities in 20 States in May. These included 2 cities in Arizona, 2 in California, 9 in Florida, 3 in Georgia, 4 in Idaho, 1 in Maine, 1 in Michigan, 2 in Minnesota, 1 in Mississippi, 2 in Missouri, 1 in New Hampshire, 2 in North Carolina, 2 in Oregon, 2 in South Carolina, 3 in Texas, 3 in Washington, 1 in West Virginia, 2 in Wisconsin, and 1 in Wyoming. Of the foregoing all traps placed in Florida were in the regular trapping schedule, as were 2 in Georgia, 1 in Missouri, 1 in North Carolina, and 2 in South Carolina. The remainder comprised traps distributed by Bureau field stations.

Lead arsenate treatment introduced on Eastern Shore of Maryland.--A large nursery at Pittsville, Md., has indicated their intention to treat approximately 4,500 nursery plants with arsenate of lead. This will be the first attempt in the Salisbury, Md., area to treat any large number of plants with this material. Owing to a decrease in the nursery and greenhouse inspection work on the Eastern Shore, 5 temporary inspectors were terminated in May. Practically all nurserymen in this area reported an increase in business over that of previous years. One nursery near Salisbury reported that it did one-third more business this season than ever before.

Gypsy moth certification.--Shipments in which gypsy moth infestations were found during the month were limited to 3 lots of nursery stock, in each of which solitary egg clusters were found, and 1 carload of logs and 4 carloads of lumber, from which 16 egg clusters were taken. Fifteen temporary inspectors were employed on nursery inspection during the month--2 stationed at a forest nursery in western Maine, 3 at nurseries in Massachusetts, 1 at nurseries in Newport, R. I., and 9 at Connecticut establishments. Two of the men in Connecticut were employed on Japanese beetle fumigation and inspection of soil-free plants. All others were assigned to gypsy moth inspection.

First-record Dutch elm disease infections.--Four first-record confirmations of Dutch elm disease were reported in May. One was from the town of Ghent, Columbia County, N. Y., near the southern boundary of the town and approximately 9 miles from any other known confirmed trees. A first-record case was found in Kiefer (Election District No. 33), Allegany County, Md. This was a devitalized tree which evidence indicated had been washed out during the high water of 1936 and was dying because of exposed roots. The other two first-record finds were in Luzerne County (Wilkes-Barre, Pa., area)--one in Pittston Township and one in Plains Township.

Elms in magnesia-waste reservoir present removal problem.--Removal of four elm trees from a property owned by a plant manufacturing magnesia and related products presented unusual difficulty. The residue from the plant is pumped into a large reservoir covering about 100 acres. Numerous trees have been killed by this accumulation of waste material, which in some places reaches a depth of 30 feet. The material is liquid when fresh but after exposure to the sun attains the consistency of soft putty and is adhesive. The trees were located about 100 feet from the shore. After several unsuccessful attempts at wading, a series of corduroy roads were built. This operation required considerable time and 2 entire days were spent in removal of the four trees.

Heavy bark beetle infestation.--An unusually heavy infestation of Scolytus multistriatus Marsh. was reported during the week ended May 17 in an elm removed from the Perkiomen Creek section of Salford Township, Montgomery County, Pa. Examination disclosed that this tree averaged 45 galleries per square foot of wood surface. The tree was infested from the base to the small upper branches. Although no emergence was noted, the insects were all in an advanced larval or pupal stage. A sample was sent to the laboratory for culturing.

Agencies cooperate in disposal of cut elm wood.--The Connecticut Light and Power Company has joined the Connecticut State Highway Department's Division of Engineering and Construction and Division of Roadside Development in agreeing to cooperate with the Dutch elm disease eradication project to the extent of having all elm wood cut in their clearing of rights-of-way disposed of by burning.

Dutch elm disease scouting hazards.--An elm-mapping crew working in Sullivan County, N. Y., had an eventful day when they killed two rattlesnakes and encountered five bears all on the same day. Almost every day some field crew in New York encountered rattlesnakes or copperheads. No cases of snake bite reported to date.

Elm leaf beetle infestation heavy in Orange County, N. Y.--Elm leaf beetle damage in Orange County was expected to be heavy this year. Numerous adults have been observed at work and damage to foliage is already apparent. Many trees through the center of the county have been observed to be loaded with egg clusters, and other sections are probably as bad off. Defoliation will soon start in earnest, as many of the eggs have already hatched, with others about ready to hatch. The expected defoliation will complicate the early Dutch elm disease and bark beetle infestation symptoms and will also result in much more dead wood later.

FOREST INSECT INVESTIGATIONS

Promising European tryphonine parasite of European spruce sawfly recovered.--P. B. Dowden, New Haven, Conn., reports that 2 males and 1 female Exenterus claripennis Thomson emerged in May from sawfly cocoons collected at Jacksonville, Vt., last fall and hibernated at this laboratory. This parasite was released in this area last summer, and this recovery gives considerable promise that the parasite has established itself. The sawfly infestation in this area is light, and it required about an hour for 2 men to collect 120 healthy cocoons. W. F. Sellers reported in the News Letter of July 1940 on the introduction of 2 promising European tryphonine parasites from Canada. He states that more recent information indicates that in Europe E. claripennis is a parasite of the European spruce sawfly (Gilpinia polytoma Htg.) and Exenterus marginatorius F. is a parasite of the European pine sawfly (Neodiprion sertifer (Geoff.)).

Recently established tachinid parasite of gypsy moth available for distribution.--W. F. Sellers, New Haven, states that a small liberation consisting of 100 males and 99 mated females of Parasetigena silvestris R.-D., an introduced European dipterous parasite of the gypsy moth, was made on May 26 in the vicinity of Lake Mashepaug, Union, Conn. It was reported in the News Letter for July 1940 that this parasite had been recovered in encouraging numbers at several places in Massachusetts. From 360 puparia hibernated at this laboratory, 143 males emerged between May 6 and 13, and 123 females emerged between May 8 and 20. This is the first time material has been available from New England sources for distribution in areas where the parasite has not been previously liberated.

Termite protection in National Defense program.--C. W. Collins and R. J. Kowal, of the Morristown, N. J., laboratory, are covering the States of New Jersey, Pennsylvania, Maryland, and Delaware in an advisory capacity regarding termite protection in National Defense Building Projects which the Division recently initiated throughout the country. During the last 4 months they have engaged in consultations with architects, construction engineers, and army officials and have made inspections in connection with about 35 defense building projects financed by the U.S.H.A., P.B.A., and F.W.A., of the Federal Works Agency and the United States Army. These have consisted of housing projects composed of from 20 to 530 dwelling units, and army posts of less than 10 to over 800 new buildings. Old buildings have also been given attention in the case of army posts. Those in charge of projects have welcomed the assistance offered by the laboratory. Consultations with architects during the planning stage of projects have been sought particularly, because of the ease of providing for termite protection at that time. Nevertheless, in numerous instances where it was impossible to advise before construction began, important measures were recommended which, if properly applied, would reduce the possibility of termite infestation. A large number of additional projects have been authorized and approved for construction in the States mentioned above.

A stage of Dutch elm disease found in brood chambers of ambrosia beetle.--W. D. Buchanan, of the Morristown, N. J., laboratory, has found coremia of Ceratostomella ulmi in a number of brood chambers of Xylosandrus germanus Blandf. The chambers were inhabited by hibernating adults in sections of elm stored in metal cylinders at the Morristown laboratory from September 1940 until they were examined in May. The sections came from small elm trees which, after being infected artificially with C. ulmi, were injected with dichlorophenol in 50-percent alcohol and then exposed to beetle attack. Mr. Buchanan has previously shown that the Dutch elm disease may develop in trees that are attacked by beetles contaminated with this fungus.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Freezing nights cause gypsy moth larval mortality.--On several nights in May the temperatures dropped well below freezing, and considerable injury was caused to foliage. The freezing nights also resulted in a high mortality of young gypsy moth larvae, which had emerged unusually early because of the record-breaking mild weather during the entire month of April. Many egg clusters were found that had partially hatched when a sudden drop in temperature stopped the further development of the eggs. This condition was quite marked throughout the barrier zone, and it is expected that an appreciable reduction in infestation will follow in many sections. The prolonged dry spell has now lasted about 2 months, and the tinder-dry condition of the forest floor has provided an extremely serious fire hazard, although the vegetation has developed much faster than usual. The dearth of moisture has caused a rapid drop in the volume of water in many streams where it is proposed to set sprayers, and it is doubtful whether there will be a sufficient flow to supply the needs of the gypsy moth spraying program throughout the month of June, unless considerable precipitation should occur within a short time.

Three small gypsy moth infestations in Vermont apparently exterminated.--Results of a recently completed close examination of all growth surrounding a single-egg-cluster infestation in Lowell Township, Orleans County, Vt., were negative. This colony was located last December after a heavy fall of snow, which prevented a satisfactory examination of low growth, deadwood, and other debris at that time.

New gypsy moth crews start work in Vermont.--Early in May a sufficient number of W. P. A. employees was assigned to gypsy moth work in Vermont to organize six crews, but some difficulty was encountered in obtaining men whose experience and other qualifications were suitable for positions as crew foreman, as many of the men who had previously been engaged in gypsy moth work had obtained employment in private industry. One of the new crews was immediately detailed to build a temporary four-strand barbwire fence around a woodland infestation in Brandon, Rutland County, where spraying work is planned this season. Scouting was continued in

Fair Haven, also in Rutland County, and lines of hose ranging up to 6,500 or more feet in length were laid in southern Vermont areas where spraying work will be done.

Preparations for spraying in Massachusetts.--There was a slight increase, early in May, in the Massachusetts gypsy moth force, as the number of new W. P. A. workers assigned to the project more than offset the number of terminations. Several small crews were engaged in assembling material for temporary fences to be erected around areas in the barrier zone where spraying is planned. Quantities of fence posts were cut from worthless trees, with the consent of the property owners, and were set in position, preparatory to stringing the 4 strands of barbwire which constitute the fences. Barways and gates were constructed wherever necessary in order to permit access to sprayed woodlots without damage to the fences. Several wood roads were repaired sufficiently to permit driving high-pressure spraying machines to set-ups near streams or ponds; and hose lines, some of which are 5,000 feet or more in length, were laid from the proposed sprayer sites to the most distant points to be sprayed. Most of the infestations where spraying will be carried on are situated in rugged and mountainous country, which makes necessary the use of powerful spraying equipment. By the middle of the month all essential spraying equipment and supplies, except the sprayers, had been delivered to central points in the field for later redistribution to individual sprayer set-ups. Some of the W. P. A. men selected to operate spray units were given preliminary instructions in the work later in the month, using machines that had already been distributed in the field. Prospective nozzlemen were also instructed in the proper methods of applying the spray solution to different types of growth. A larger number of sprayers will be operated in Massachusetts this year than in either Vermont or Connecticut. Owing to the loss of many W. P. A. mechanics from the Greenfield repair shop to private industry, only a minimum amount of field service to the sprayers by traveling mechanics will be possible this year. The traveling mechanics render important service by rectifying minor mechanical difficulties, giving helpful instructions to sprayer operators, and preventing serious interruptions in the work due to mechanical failures.

Gypsy moth larvae emerge earlier than usual.--Most of the gypsy moth egg clusters found during the week ended May 3 by Massachusetts scouting crews had hatched; although, in most instances, the larvae were still massed on the egg clusters and were easily killed by creosote. The larvae were slightly more advanced at several small infestations located on scattered trees in the Connecticut section of the barrier zone. Many of the larvae had already crawled away from the egg clusters in search of food, and the proximity of stone walls or rock heaps at a few locations increased the difficulty of promptly exterminating the insects. There appeared to be no particular problem connected with the extermination of most of the infestations.

Spraying begun in Connecticut; additional man-power supplied.--Connecticut W. P. A. officials made a sincere effort, early in May, to obtain more workers for assignment to the gypsy moth project, in order that an ample number of men would be available to assist in spraying and other seasonal work during the next 6 or 7 weeks. Later in the month two local projects were temporarily suspended and the men were transferred to gypsy moth work to operate the spraying units during the last week in May and the entire month of June. This work is of primary importance if the degree of infestation in the Connecticut section of the barrier zone is to be reduced to a point where the extermination of the insect may be readily accomplished. Large quantities of spraying supplies and equipment were distributed to several central points in Connecticut early in the month. Redistribution will be made as needed throughout the spraying season by small trucks which service the sprayers. The early distribution of this material was made necessary by the rapid development of the foliage, which is further advanced than it has been for several years at this season. It is important that actual spraying operations be delayed until the oak foliage, which is a preferred food of gypsy moth larvae, is from one-half to two-thirds grown so that it will retain a sufficient amount of the arsenical solution for effective killing. The foliage had developed sufficiently so that actual spraying work could be started on May 16 in Morris Township, in the southern part of Litchfield County, and it was proposed to begin spraying in other sections of Connecticut a few days thereafter.

Brush-disposal machine suspends work during spraying season.--Approximately one-half of the piled brush and other waste wood in the State forest in Cornwall, Litchfield County, Conn., had been reduced to sawdust by the brush-disposal machine by the middle of May. The operation of this machine will be temporarily discontinued until the gypsy moth spraying season has passed.

Spraying residential areas in Pennsylvania.--More than 3,600 permits were obtained for gypsy moth spraying work in the Pennsylvania area this season, but the completion of all the work planned is problematical because of the acute labor situation in that section. Although the gypsy moth project was approved and ample funds were available for the work, the W. P. A. authorities were unable to fill the requisitions for the 800-odd workers needed to conduct the spraying as planned. A lesser number of workers was supplied later in the month, and the men were immediately detailed to the thorough treatment of the most important infestations. Men were selected from the group of new employees to drive trucks and operate spray units, and received instructions concerning their assignments. Early in the month hose, lead arsenate, fish oil, and other supplies were distributed to central points in the field, and hose lines were laid from the sprayer set-ups to the areas to be sprayed. A sufficient number of N. Y. A. enrollees was available to man a small number of sprayers and washers in the residential areas of Luzerne and Lackawanna Counties, and work was started in those sections on May 19. In residential spraying it is essential that each sprayer be followed closely by another machine loaded with clear water, so that spray residue may be thoroughly washed from buildings, walls, garden furniture, and other objects before the solution has had an opportunity to dry. The residential area represents a small proportion of the total area in Pennsylvania where spraying was planned for this season, and the spraying of that section will be completed by the time the woodland trees have reached full foliage. The sprayers will then be transferred to points where extensive woodland spraying will be conducted during the remainder of the season.

Quarantine inspection work reduced by warm weather.--The volume of gypsy moth quarantine inspection work in the Pennsylvania area was considerably reduced by the approach of warm weather. Anthracite-coal mining was drastically curtailed, resulting in a sharp decline in the demand for mine timbers of all sorts. Many of the timbers used in the mines are cut in the quarantined area, and they must be examined by inspectors before transportation is permitted.

C. C. C. gypsy moth work materially less than estimate for May.--A total of 599 6-hour man-days was used by the C. C. C. on gypsy moth work east of the barrier zone under the supervision of this Bureau during the 5-week period reported for May. The weekly totals gradually rose from a low of 46 man-days used during the week ended May 3 to a high of 241 man-days for the week ended May 31. This was considerably less than the 300 man-days per week that had been planned. The estimated figures were based on proposed 15-man crews, while the crews actually averaged only 7 men during the first half of the month, owing to low enrollments at the camp. Later in the month it became imperative that the crews be increased to 15 men in order that they could handle the spraying equipment. Other factors contributing to the loss of proposed working time were the closing of the woods in Connecticut for a considerable period, the necessity of confining some of the crews to the vicinity of the camps where they would be immediately available if needed for fire fighting, an appreciable amount of time spent in actual fire fighting, the loss of gypsy moth work by one crew for a week while the trained foreman was on annual leave, and a small amount of time lost because of stormy weather. The work done during the month was accomplished by one crew in Massachusetts and three crews in Connecticut--one crew from each of three camps. No C. C. C. men are available for gypsy moth work in Vermont at present.

C. C. C. gypsy moth work during May.--During the first part of May C. C. C. gypsy moth work east of the barrier zone consisted principally of thinning, scouting, and creosoting, with the addition of some burlapping work. It will be necessary to temporarily suspend the last type of work during the period when actual spraying is in progress because of the lack of man power available. Sprayers and equipment were transported from the Greenfield Storehouse to the camps, hose lines were laid, roads were repaired, dams were built, and other preparations were made for the start of the spraying season. During the last week in May the entire force available was used on spraying work, which was started on May 22 in Connecticut and on May 29 in Massachusetts. While it had been hoped that the sprayers could be operated on a double-shift basis at some of the camps, the low enrollment at the camps compelled a change to single shifts by 15-man crews. Spraying is being done at the most dangerous infestations, but a shortage of water may force a shift to infestations of lesser intensity but with a more plentiful water supply later in the season. If this becomes necessary there will be time lost to actual spraying work while the sprayers are moved and new lines of hose laid. Up to May 31, 10 acres had been sprayed with 368 pounds of lead arsenate and 11 gallons of fish oil in Massachusetts, and 99 acres had been sprayed in Connecticut with 3,602 pounds of lead arsenate and 112 gallons of fish oil.

Several agencies cooperate in C. C. C. gypsy moth spraying program.--C. C. C. spraying operations at serious gypsy moth infestations east of the barrier zone were made possible by the cooperation of Federal and State agencies. The Bureau of Entomology and Plant Quarantine loaned one sprayer and 4,000 feet of hose for use in Massachusetts, and 2 sprayers and

9,000 feet of hose for the work in Connecticut. The Bureau also supplied a mechanic who will visit the machines in the field and make minor repairs and adjustments. The Connecticut State Gypsy Moth Organization loaned one sprayer and 4,000 feet of hose for use in that State, together with experienced men to operate the sprayer. The C. C. C. is furnishing labor, foreman supervision, lead arsenate, and fish oil, and also the gasoline and oil necessary to run the sprayers. Ten tons of lead arsenate and 12 barrels of fish oil are available in Connecticut, and $4\frac{1}{2}$ tons of lead arsenate and 6 barrels of fish oil in Massachusetts. This constitutes a sufficient supply of materials to continue the spraying well into July if the development of the caterpillars warrants the extension of the work after the end of June.

C. C. C. work within the barrier zone.--Two C. C. C. gypsy moth foremen were transferred from the camp at Chester, Mass., to two camps within the barrier zone in Massachusetts, when the Chester camp was moved to Fort Edwards. Plans of work calling for 20-man crews were approved, the time to be used chiefly on scouting work under the supervision of this Bureau, with some thinning and burlapping work also included. The low enrollment at the camps has made it impossible to obtain the 20-man crews, although it is hoped that smaller permanent crews can soon be furnished, and no men were available during most of May, owing to fire-fighting activities. The men were employed in scouting on days when they could be used on gypsy moth work. Late in May one of the two foremen was transferred to the camp in Florida, Mass., to assist in the spraying work from that camp for the duration of the season.

Results of previous defoliations observed.--A trip was made by S. S. Crossman to four of the State gypsy moth districts in the eastern part of Massachusetts to observe the results of repeated severe gypsy moth defoliations. Each district was visited in company with the State gypsy moth superintendent of the area. In one area in the North Shore section, where severe defoliation has not occurred until a short time ago, trees are now dying after 1 year of heavy feeding and 1 year of extensive defoliation. Similar conditions were also observed in another area in the same section where recent severe defoliation followed a period of heavy defoliation 10 years ago. A visit was also made to another location in eastern Massachusetts consisting chiefly of white oaks and white pines, where recent defoliation has killed or weakened many of the oaks and some of the pines. The owner of this property is now engaged in removing all oak trees in an attempt to salvage something from the oaks and to try to save the remainder of the pines. In another section, white pines which had been growing in a mixture of hardwoods favorable to gypsy moth development were dead and fallen. These trees have been down for several years, and the owner is convinced that they were killed by gypsy moth defoliation. Each of the districts visited had been defoliated from once to several times during the last 15 or 20 years. Many trees were seen which died several years ago, and numerous others were weakened and deformed and are gradually dying. Most of the dead trees were oaks, although dead white pines, spruces, and hemlocks were also observed. The dying of the oaks was more apparent where they were growing in poor soil, especially on ridges, where the ground dried out as the trees were defoliated. In some areas the hardwoods had nearly disappeared, and much pitch pine was coming in. Apparently this condition will eventually prevail over large areas in the Cape Cod district.

PLANT DISEASE CONTROL

A rapid method for retracing survey lines in sugar pine region.--Field work in blister rust control makes wide use of the rectangular system of public-land surveys, to which the boundaries of control units and subdivisions of the units are related. For instance, reconnaissance and checking work are based on the sectional system of the land survey. Unfortunately the original surveys in many places are obscurely marked on the ground, and the size and shape of the sections are extremely irregular, owing in large part to having been laid out many years ago under the contract system with crude instruments and under poor conditions. Many lines and corners, too, have been obliterated by time. The need, therefore, has arisen for a rapid and reasonably reliable method of retracing section lines in order to reestablish points upon the ground. Such a method of running boundary lines and marking them for future reference has been evolved through considerable field experience, and has proved well adapted to the need. It is based upon chaining, and involves a technique which has been demonstrated to have a probable error of about 10 feet per mile. The method has been standardized and is now being written into manual form for convenient reference in the field. The manual also will contain relevant information about the public-land survey, how to search for obliterated corners, the use of the topographic Abney hand level and chain, and many useful facts and tables. It is hoped that the new method will result in more accurate maps and in greater general efficiency in administering the blister rust control program. Any Bureau office interested in work of this nature and desiring to have a copy of the manual may obtain one by writing to the Bureau of Entomology and Plant Quarantine, 610 Syndicate Building, Oakland, Calif.

"Fruiting" cankers found in sugar pine region.--On May 17 D. R. Miller, who is scouting for blister rust in Siskiyou County, Calif., reported the examination of 357 cankers in 1 area, and of this number 96 were producing aecia. There were more fruiting cankers in this area than in all the others examined to date. Three new spots of rust have been located, one in sec. 35, T. 47 N, R 11 W, (Mt. Diablo B & M), consisting of a single canker, another in the NW½ of sec. 24, T 17 N, R 7 E, (Humboldt B & M), and the third, with at least 19 infected trees and 17 of 56 cankers producing aecia, was located in the SW½ of sec. 12, T 17 N, R 7 E. There seem to have been two waves of infection on some of these areas, one in 1935 or 1936 and another in either 1937 or 1938. Mr. Miller stated that at the center they found all fruiting cankers were on 1934 or 1935 wood, while there were a number of younger cankers on 1937 and 1938 wood.

Vermont leader advises against planting white pine on heavy Ribes sites.--An owner of a forest tract in Greensboro, Lamoille County, Vt., recently asked S. D. Conner, State leader of blister rust control in Vermont, to examine his pine lot, as a large number of dying trees had been observed. It was found that the tract consisted of a 20-acre plantation, planted to red and white pine intermixed. The plantation had not previously come to the attention of the blister rust control organization and no protective work had been carried out. About 50 percent of the 15-year-old white pines were found infected with blister rust and many of the trees had already died. Since the plantation was surrounded on three sides by swamp areas on which *Ribes* grew abundantly it was decided that the cost of protection would be far greater than the value of the pine involved and the owner was advised against further planting on the site. The owner's wife had personally destroyed a considerable number of *Ribes*, having made her own identification of the disease from Miscellaneous Publication 22, but such a small percentage of the total number of *Ribes* on the area had been destroyed that the work had been ineffective in control. In general, the Division recommends against planting white pine on sites where *Ribes* are so numerous that control operations would be expensive and, under arrangements with the Forest Service and Soil Conservation Service, members of the blister rust control organization are usually given the opportunity of checking in advance on such proposed white pine planting sites as are under Federal control, in order to avoid either the loss of Federally planted pine or an excessive cost for control measures.

Barberry bushes destroyed in Indiana, January 1 to April 30.--The following table summarizes the results of barberry-control operations in Indiana since January 1, in which 591 bushes were destroyed on 65 properties.

County	Area covered	New properties inspected	Bushes destroyed on new properties	Old properties inspected	Old properties cleared	Bushes destroyed on old properties
	Sq. mi.	Number	Number	Number	Number	Number
Resurvey:						
Allen	95	3	3	222	13	106
Clinton	0	0	0	26	0	0
Franklin	19	0	0	16	3	7
Hamilton	0	1	2	46	3	0
Howard	17	0	0	32	0	0
Lake	0	1	3	0	0	0
Lagrange	0	1	1	0	0	0
La Porte	88	0	0	109	23	296
Marion	5	1	2	93	1	1
Montgomery	0	1	1	0	0	0
Porter	11	0	0	12	0	0
Putnam	0	1	1	0	0	0
St. Joseph	53	6	10	138	6	153
Tippecanoe	0	2	2	0	0	0
Tipton	0	0	0	12	0	0
Whitley	8	0	0	26	2	3
Total	296	17	25	732	51	566
Intensive original survey:						
Gibson	142	0	0	0	0	0
Sullivan	253	0	0	0	0	0
Total	395	0	0	0	0	0

In the "Resurvey" section of the table, the counties in which work was done are listed alphabetically. For some of the counties the figures do not show the complete picture, because additional work was done outside the period January 1 to April 30, covered by the table. The data in the table show that the problem of resurvey is a serious one. Of course, in some Indiana counties, only the rechecking of a few old planted barberry locations is required. Such was the case in Tipton County, where it was necessary only to recheck 12 old locations of planted barberry bushes. As no new sprouts or bushes were found there in 1941, perhaps with 1 more recheck the county may be regarded as permanently free of barberry bushes. However, the situation is entirely different in counties such as Allen, where, during the period under study, it was necessary to survey 95 square miles of area where barberry bushes had formerly been found growing wild, in order to find and kill new bushes growing from seeds left in the ground by bushes destroyed in previous surveys. In the course of resurvey in that county, barberry bushes were found on 3 new properties. These discoveries will extend the area which must be resurveyed in the future. Therefore, in counties such as Allen, the task of the next resurvey will be more difficult than it was in 1941. It is encouraging to note that in rechecking 222 old locations of barberry bushes in Allen County, only 13 had sprouts or new bushes. That is, less than 6 percent of the old locations had new bushes in 1941. For the period January 1 to April 30, resurvey was completed on 296 square miles of area, and 25 barberry bushes were found on 17 new properties. A total of 732 old properties were inspected and on 48 of these 566 new bushes were found and destroyed. Intensive original survey work was completed in Gibson and Sullivan Counties with the inspection of 395 square miles of area.

Preliminary results of stem rust survey in Mexico and southern Texas.--Preliminary results of the rust survey made in Mexico this spring indicate that physiologic races of stem rust 38 and 59 are the most common this year. Marquis and other hard red spring wheats are resistant to these races in southern Mexico. In fact, Marquis continues to be rust resistant as far north as San Luis Potosi. Last year there were some indications that race 56 had become established in southern Mexico but, if so, it either did not persist or persisted in extremely small amounts as it has not appeared in any of the 97 isolates identified from southern Mexico this year. In northern Mexico, on the other hand, the situation is quite different. There is further evidence that there may be an intimate relationship between the rust there and that which subsequently develops in the United States. For this reason, preliminary steps have been taken to cooperate with the Mexican Department of Agriculture in introducing or developing varieties of grain that are more resistant to stem rust than those now commonly grown. Thus far a total of 52 isolates have been identified from 38 collections made in northern Mexico, comprising 6 different races, of which race 17 is the most prevalent. Last year, it may be recalled, there was a decided increase in race 17 over previous years, both in northern Mexico and in the United States; and collections of rust obtained from northern Mexico again this year indicate a further increase in the prevalence of this race. The first few collections identified from southern Texas indicate that races 17 and 56 are likely to be the most prevalent there, also, but it is too early to make a definite statement to that effect. More than 150 collections from the southern part of the United States are now in culture and identifications will be completed within the next few weeks. More than 200 aecial collections from barberry bushes have been received for identification. All of the material has been used as inoculum, but no identifications have been made.

COTTON INSECT INVESTIGATIONS

Boll weevil control with calcium arsenate applied at different times.--The usual recommendation for boll weevil control is to begin dusting with calcium arsenate when 10 percent of the squares become infested and to continue at 4- or 5- day intervals until the weevils are brought under control or a crop of bolls is made; also that dusting be done at night or early in the morning when the plants are wet with dew and the air is calm. Some growers and research workers experienced in cotton dusting have questioned the advisability of beginning dusting at the 10-percent-infestation level and there has been a tendency in recent years to wait until 20 to 50 percent of the squares are infested before beginning to dust. This is especially true on the rich Delta soils where there is sufficient fertility to keep the plants fruiting until late in the season. Dusting at night or in the early morning when the plants are wet with dew has obvious disadvantages. A series of experiments was conducted by M. T. Young, G. L. Garrison, and R. C. Gaines, at Tallulah, La., in 1940 to obtain information on these questions. The plots were 1/10-acre in size and arranged in randomized blocks. The plots were surrounded by buffer areas to reduce interplot movement of insects and calcium arsenate drift, making the combined areas of plots and buffers receiving similar treatment approximately 1/4 acre. In one series of experiments 6 applications of calcium arsenate dust beginning at 10-percent infestation, 3 of which were made before and 3 after boll weevil migration had started, gave an average increase over the checks of 424 pounds of seed cotton per acre; 3 applications beginning at 10-percent infestation, made before migration had started and none after migration, 140 pounds; and 3 applications beginning when migration had started and 39 percent of the squares were infested, 332 pounds. Under the conditions prevailing in these experiments 3 late applications beginning when 39 percent of the squares were infested gave the greatest increase in yield per application. In another series of experiments, applications beginning at 8- and 25-percent infestation of squares were followed by significantly better yields than were applications beginning at 70-percent infestations, but differences between the yields following applications beginning at 8 and 25 percent were not significant. Each of the 3 treatments gave a highly significant increase over the checks. Eight applications beginning at 8-percent infestation gave an average increase of 522 pounds of seed cotton per acre; 5 applications beginning with a 25-percent infestation, an increase of 580 pounds; and 4 applications beginning with a 70-percent infestation, an increase of 350 pounds. In the third series where applications were not begun until migration had started and 19 percent of the squares were infested, 1 application gave a nonsignificant average increase in yield over the checks of 70 pounds of seed cotton per acre; 2 applications, a highly significant increase of 212 pounds; and 3 applications, 260 pounds. A large number of tests conducted at Tallulah since 1934 on the time-of-day and the interval between applications for the best weevil control have recently been summarized. The plots from 1934 to 1938 were arranged in series and were parallel to each other. The treated areas were 3/4 acre or more in size and treatments were not assigned at random. In 1939 and 1940 the plots contained 1/4 acre or more and were arranged in randomized blocks. In 1 series of experiments plots were dusted at 4- or 5-day intervals between daybreak and 7 a. m. (early morning), between 1 and 3 p. m. (midday), and between 6 and 7 p. m. (late afternoon). In the second series the plots were dusted in the early morning at 4-, 6-, and 8-day intervals. In both series applications were begun when 10 percent of the squares were infested. The first, or "time-of-day" series covered a 5-year period and included 19 replications. The average infestations after treatments were started were 38.9 percent in the checks; 12.5 percent for the early morning applications; 19.4 percent for the midday applications; and 20.7 percent for the late afternoon applications. The average increase in yields over the checks from the early morning applications was 287 pounds of seed cotton per acre; from the midday applications, 282 pounds; and from the late-afternoon applications, 232 pounds. The second, or "time-interval" series covered a 7-year period and included 29 replications. The average increase in yields over the checks was 178 pounds of seed cotton per acre for the 4-day applications; 101 pounds for the 6-day applications; and 76 pounds for the 8-day applications. The square infestations were light during the greater part of the fruiting seasons of 1934 to 1937, inclusive, and the gains were small. Infestations were somewhat higher in 1938 and much heavier in 1939 and 1940, with correspondingly larger gains.

Beet armyworm on cotton.--A general infestation of Laphygma exigua (Hbn.) on cotton in Arizona during May was reported by T. P. Cassidy and T. C. Barber. The cotton growers call this insect the "web worm," because of the loosely spun webs on the lower surfaces of the leaves, where the small larvae feed. Small larvae of the yellow-striped armyworm (Prodenia ornithogalli Guen.) were also present, and in collections from five sections of the State submitted to Carl Heinrich, averaged about 5 percent of the total number of larvae. The first serious damage by beet armyworms on cotton this season was reported from Litchfield on May 10 and their occurrence a few days later generally distributed over the Santa Cruz and Salt River Valleys and the Case Grande, Coolidge, and Eloy areas caused great concern to the growers. The small larvae feed primarily on the seedling leaves, while the larger larvae (after second instar) oftentimes girdle the plants and destroy the terminal buds, thus killing the plants. After the cotton is 6 to 8 inches tall it is beyond damage. The larger larvae crawl into cracks in the soil and under debris during the heat of the day and this habit has been used as a basis of control by "flash" irrigation. Many of the older larvae, as well as the smaller larvae washed off the plants, are sealed in the soil and killed by the irrigation or washed out of the field by the "tail" water. The killing of the larvae and stimulation of plant growth by irrigation gave very satisfactory control; however, in many cases the large acreages infested could not be quickly irrigated and large quantities of calcium arsenate dust were used. One company dusted 1,200 acres by airplane. They started dusting at the rate of 10 pounds per acre but, as calcium arsenate kills rather slowly, it was thought that not enough dust was getting on the small seedlings to give a quick kill and the rate was increased to 15 pounds per acre. Airplanes were also used in other areas. On some of the cotton at the Mesa Experiment Station where calcium arsenate was applied with hand guns, Mr. Barber estimated that 50 percent of the worms were dead 24 hours later. In general, the results from the calcium arsenate dust were fairly satisfactory but a quicker acting poison would be more effective. It is difficult to estimate the actual damage caused by this outbreak. Much of the cotton was small and had not been chopped. Growers were advised to delay thinning until the worms were controlled and, with the prompt applications of irrigations and calcium arsenate dust, the outbreak was brought under control in most fields before the stand was seriously damaged. Some replanting was necessary, especially in Pinal and Maricopa Counties. No damage was observed or reported to other crops and it is not known on which host plants the population built up before the moths migrated to cottonfields. Unusually heavy rains last winter and this spring caused a great deal of vegetation to develop, and this may have been a factor in causing the outbreak. Mr. Cassidy reports that it was the heaviest and most general infestation he has observed in Arizona in the last 15 years and the State and Federal entomologists were kept busy day and night for about a week.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

New work Projects.--Two new work projects initiated on April 30, 1941, are being undertaken in cooperation with the Washington Agricultural Experiment Station--one relating to flea beetles affecting potatoes and the other to insects affecting brambles. Headquarters for the work with flea beetles has been established at Union Gap, Wash., while that with insect pests of brambles is at Puyallup. At present the potato flea beetle (*Epitrix cucumeris* (Harr.)) and the Western potato flea beetle (*E. subcrinita* (Lec.)) are particularly destructive to potatoes produced in Washington, Oregon, Colorado, and Nebraska. The damage which they cause is twofold: (1) The adults feed on the foliage, resulting in a stunting of the plants and subsequent reduction of yield; (2) the larvae feed in the developing tubers, cutting shallow tunnels just below the surface. The presence of scarified tissue reduces the quality of the potatoes, often rendering them unsalable, and the presence of injured tissue provides a medium for the entrance of soil-borne organisms which may cause decay of the tuber. Of the more important pests affecting raspberries and loganberries, studies will be conducted with the raspberry root borer (*Bembecia marginata* (Harr.)), the raspberry cane maggot (*Pegomya rubivora* (Coq.)), leaf rollers, and possibly other pests. The raspberry root borer feeds within the crown of the plant just below the surface of the soil, devitalizing the plant and curtailing its productivity, which under extreme conditions may kill the plant outright. The raspberry cane maggot feeds within the young fruiting canes and causes them to droop and die. Leaf rollers feed upon the foliage. The initiation of these work projects was made possible by the completion of the work on the raspberry fruitworm (*Byturus* sp.), the redberry mite (*Eriophyes essigi* (Hassan)), and that on parasites of the European earwig (*Forficula auricularia* L.), which was being conducted at Puyallup, Wash. B. J. Landis and C. W. Getzendaner are conducting the investigations on potato flea beetles and W. W. Baker is assigned to those on insects affecting brambles. An investigation of aphids affecting potatoes is being undertaken in cooperation with the Maine Agricultural Experiment Station, with headquarters for the summer at Houlton, Maine. Begun during the summer of 1940, the phases of study on this problem are being materially expanded this year with Theo E. Bronson, of the Madison, Wis., laboratory, again serving as leader, in close cooperation with entomologists of the Maine station. The problem concerned is the transmission to the potatoes of a virus disease known as "leaf roll" by three species of aphids, namely, the green peach aphid (Myzus persicae (Sulz.)), the buckthorn aphid (Aphis abbreviata Patch), and the potato aphid (Macrosiphum solanifolii (Ashm.)). In addition to affecting the foliage of the growing plant, the disease causes a condition in the tubers known as "net necrosis," a darkening of the tissues which lowers the quality of the tubers making them unfit for use as food or as seed stock. It has been found further that the yield of potatoes in 1940 was reduced 42 percent by feeding of the aphids alone.

Changes in leadership.--The change in the leadership of the Logan, Utah, laboratory, necessitated by the military furlough of H. E. Dorst, has resulted in the assignment of Walter E. Peay, formerly of the Moscow, Idaho, laboratory, to serve in this capacity. Captain Dorst is serving in the Sanitary Corps of the Army as camp sanitary officer and assistant medical inspector at Camp Croft, Spartanburg, S. C. The work of the Logan, Utah, laboratory includes investigations on the beet leafhopper (Eutettix tenellus (Bak.)) and the tomato fruitworm (Heliothis armigera (Hbn.)). The work of the Columbus, Ohio, laboratory also has recently been affected by the call to active duty at Fort Benning, Ga., of Captain H. C. Mason.

Hydrocyanic acid gas in control of aphids on lettuce.--C. A. Weigel and G. V. Johnson, of the Beltsville, Md., laboratory, conducted further tests during the first quarter of 1941 with hydrocyanic acid gas to obtain additional data on the value of using this fumigant as a substitute for the nicotine-smudge method commonly employed to control aphids and whiteflies on lettuce growing in the greenhouse. They report that the series of 6 weekly fumigations, at a dosage of 1/8 ounce per 1,000 cubic feet, reduced the population of the green peach aphid to a low level, whereas on nonfumigated plants the insects continued to multiply in numbers. No injury to the foliage of the lettuce was observed from the fumigations. The treatment consisted of a series of 6 weekly fumigations of lettuce (variety, Grand Rapids) at a dosage rate of 1/8-ounce of calcium cyanide per 1,000 cubic feet of space in a greenhouse of about 21,160 cubic-feet capacity. In the seventh or final exposure the rate was increased to 3/16-ounce per 1,000 cubic feet to determine whether injury would occur at this concentration. Mortality counts of the aphids made after the first and last exposures at the 1/8-ounce rate showed that a much lower kill resulted from the latter exposure. This was in agreement with the results of previous tests which showed that as the size of the plants increased the kill of aphids was less, no doubt being due to poorer dissemination of the fumigant among the larger plants. It was also found that mortality of the aphids following the fumigation at the 1/8-ounce rate was higher in this experiment than for the 1940 winter-crop experiment at the same dosage rate. The reasons for this difference are not definitely known. Population counts as tabulated below showed that the series of 6 exposures at the 1/8-ounce rate reduced the average aphid population from 65.9 to 3.2 aphids per leaf. In the case of the nonfumigated plants in the bed of lettuce, which were protected by gastight covers during each of the fumigation exposures, there was an increase in the average population to 116.8 aphids per leaf.

Sweetpotato weevil overwinters in wild host plants.--From examinations of the roots and crowns of many wild host plants during March 1941, K. L. Cockerham and O. T. Deen, of the Sunset, La., laboratory, report that the results obtained confirm the former belief that *Cylas formicarius* (L.) successfully overwinters in some of the perennial wild hosts, but there is no evidence that overwintering occurs in the annuals. Living larvae were found in the roots and crowns of *Ipomoea littoralis*, *I. dissecta*, and *I. trichocarpa*, but none were found in *I. jalapa*, *I. pandurata*, or *I. lacunosa*. The location and number of plants examined and the numbers of specimens of the sweetpotato weevil recovered were as follows:

Host species	Location	Plants examined	Living sweetpotato weevils recovered
		Number	Number
Ipomaea trichocarpa	Sunset, La.	16	1 larva
I. jalapa	do.	4	0
I. pandurata	do.	8	0
I. littoralis	Pass Christian, Miss.	28	19 larvae, 1 pupa
I. dissecta	do.	105	2 larvae

The examinations were made during the period March 5 to 27 and all but one of the larvae recovered were in the third instar.

Tolerance of depotted delphinium plants to treatments for cyclamen mite.--The results of treatments from replicated field-plot tests conducted during 1940 at Thurmont, Md., by Floyd F. Smith, of the Beltsville, Md., laboratory, indicated that delphinium grown in pots successfully withstood the hot-water and methyl-bromide treatments, which have previously been found effective against *Tarsonemus pallidus* Banks. Following treatment of the depotted plants during May, they were grown in the field and the records showed that at no time during the growing season were there noticeable differences in the growth or vigor between untreated plants and those that had been submerged in hot water or fumigated with methyl bromide. The more important results from this experiment are given in the following table.

Treatment	Delphinium variety	Plants in test: Planted	Plants in test: Survived to June 20[1]	Flowers produced per plot (average)
		Number	Number	Number
Check-------------	Blackmore & Langdon hybrid	504	459	101.71
Hot water---------	do.	504	470	104.86
Methyl bromide---	do.	504	464	107.14
Check-------------	Wrexham hybrid	360	352	113.40
Hot water---------	do.	360	347	114.60
Methyl bromide---	do.	360	352	116.20
Check-------------	Gold Medal hybrid	360	278	68.80
Hot water---------	do.	360	320	80.20
Methyl bromide---	do.	360	345	82.00

[1] Date when the first flowers were produced.

These data show that there was no appreciable difference in the stand or yield of the untreated and treated plants of the 3 varieties of delphinium included in this test. The hot-water treatment consisted of immersing the depotted plants for 15 minutes in water at 110° F., while for the methyl-bromide treatment the plants were fumigated with 2 pounds of methyl bromide per 1,000 cubic feet for 3 hours at a temperature of 70°. The plants were set in the field on the day following treatment in 51 randomized plots of 72 plants each, with 5 to 7 replications of each treatment. Besides the stand and yield of plants, the effectiveness of the treatments was also compared by determining the number and length of flower spikes produced.

INSECTS AFFECTING MAN AND ANIMALS

Screwworm control in Arizona.--An allotment of $6,500 from the special appropriation provided to enable the Department to cooperate with States and local agencies in the control of incipient and emergency outbreaks of insects and plant diseases has been approved to aid in the control of a severe and unexpected outbreak of screwworms in southern Arizona. In this cooperative effort the Bureau will furnish chemicals used to make up a newly developed screwworm remedy. This remedy is known as smear No. 62, and was developed at the Bureau's laboratory in Menard, Tex., by Roy Melvin, C. L. Smith, H. E. Parish, and W. L. Barrett, Jr. The formula is given and the use of it described in a recently released circular, E-540. The field work connected with this cooperative program is under the direction of E. C. Cushing.

Mosquito surveys and National Defense.--G. H. Bradley, of the New Smyrna, Fla., laboratory, in company with personnel of the Public Health Service, inspected salt-marsh-mosquito-breeding conditions in the vicinity of 13 Defense posts during May. The survey was primarily along the Atlantic seaboard, but included 2 camps on the west coast of Florida, in the vicinity of Tampa and Dunedin.

Collection of Philippine Anopheles presented to Museum.--A collection of 280 specimens representing 26 species of Philippine *Anopheles* was presented to the National Museum by W. V. King, of the Orlando, Fla., laboratory. The collection included the types and paratypes of 6 species, as well as topotypes of several others. Slide mounts of the associated larval skins were available for most of the material.

Dipping of dogs as a control for American dog tick.--C. N. Smith, of the Vineyard Haven, Mass., laboratory, reports that " . . . in the Edgartown area, where dogs have been dipped since 1938, adults of the American dog tick were less abundant than ever before."

Sulfur dust as a tick repellent.--Mr. Smith also reports that sulfur dust was entirely ineffective in preventing ticks from catching on a drag, attaching to a dog, or crawling on a person's clothing.

Control measures for Clear Lake gnat.--C. C. Deonier and A. W. Lindquist report a promising adjunct to the attack against the *Chaoborus* adults in the regular evening shore-wise flight in the development of a screen of fire across the path of the flight. This is accomplished by running gasoline through a pipe under water and allowing the gasoline to come to the surface, where it is ignited.

Trapping horn flies.--There is a rapidly growing interest in the use of cattle-fly traps for the control of horn flies in Texas, reports W. G. Bruce, of the Dallas laboratory. The Extension Service of the Texas A. & M. College appealed for assistance to discuss methods of horn fly control at meetings of county agents and cattlemen, with special reference to the cattle-fly trap. Attendance at these meetings ranged from 50 to 300.

Rearing Aedes lateralis in captivity.--E. F. Knipling and C. M. Gjullin, of the Portland, Oreg., laboratory, report the successful rearing of this floodwater mosquito in captivity. Approximately 500 *A. lateralis* eggs were obtained from a reared colony of 30 females and 30 males when they were fed beef blood to which 12 percent cane sugar had been added. Ninety percent of these eggs were fertile. The adults were fed by placing pieces of cellucotton dipped in the blood on top of the cage.

FOREIGN PLANT QUARANTINES

Fruitfly smuggling prevented again.--A young lady in a car from Mexico told the inspector at Laredo that she had no fruit, but two papayas were hidden under a cloak on the seat beside her. Immediate examination of the fruits revealed two exit holes in one and when it was cut open three larvae were found apparently feeding upon the jellylike covering of the seed. The fruit was said to have been purchased at Victoria, Tamaulipas, Mexico. The larvae were determined by C. T. Greene as those of the papaya fruitfly (*Toxotrypana curvicauda* Gerst.).

Entomological interceptions of interest.--A living larva of the trypetid *Anastrepha mombinpraeoptans* Sein was taken at San Juan, P. R., on May 19 in a mango in baggage from St. Thomas, V. I. The coccids *Chionaspis elongata* Green, *Kuwanaspis vermiformis* (Takah.), and *Lepidosaphes* *vermiformis* (Takah.) were found at the Inspection House, Washington, D. C., on *Arundinaria* sp. leaves in express from China. Two living larvae of the trypetid *Ceratitis* sp. was found at Philadelphia on May 17 in grapefruit in stores from the Union of South Africa. A living adult of the chrysomelid *Cacoscelis screptipennis* Jac. was taken at Laredo on May 6 on an orchid plant in baggage from Mexico. Specimens of the coccid *Coccus viridis* (Green) were taken at New Orleans on March 10 on a gardenia leaf in baggage from Honduras. This is our second interception of this coccid from Honduras. A living pupa and a pupal case of the pink bollworm (*Pectinophora gossypiella* (Saund.)) was intercepted at San Pedro on May 11 in a cotton boll in quarters from Hawaii. A living larva of the Asiatic rice borer (*Chilo simplex* (Btlr.)) was found at Baltimore on April 5 in rice straw used as packing for personal effects from China. Specimens of the coccid *Asterolecanium aureum* (Bdv.) were found at Hoboken on April 30 on leaves of *Cattleya* sp. in cargo from Brazil. Two living larvae of the trypetid *Anastrepha* sp., probably *fraterculus* (Wied.), were taken at New York on April 15 in an orange in stores from Brazil. Living larvae of the olethreutid *Gymnandrosoma auratium* Da Costa Lima (?) were intercepted at Boston on March 24 in an orange in stores from Trinidad. Living specimens of the coccid *Conchaspis angraeci* Ckll. were intercepted at San Juan on April 10 on an orchid plant in baggage from the Dominican Republic. Living adults of the bostrichid *Sinoxylon anale* Lesne were found at New York on March 28 in derris root in cargo from British Malay and the Philippines.

Pathological interceptions of interest.--*Aphelenchoides coffeae* (Zimmerman) Steiner was intercepted for the first time on April 19 at New York on *Cattleya* sp. roots in baggage from Colombia. Citrus canker (*Bacterium citri* (Hasse) Doidge) was intercepted on oranges from Japan in baggage and in stores on April 18 and again in baggage on April 21 at Seattle and on May 23 at Philadelphia on sour limes in stores from the Dutch East Indies. *Ceratostomella ulmi* (Schwarz) Buis. was found on two more lots of the crating from England inspected during April and May at New York. Oranges in stores from Argentina were found to be badly infected with *Elsinoe australis* Bitancourt & Jenkins, when examined on May 22 at Boston. Determinations have just been received for two root-knot specimens (*Heterodera marioni* (Cornu) Goodey) sent in for verification, one *Echeveria* sp. root on March 17 at Laredo in cargo from Mexico, the other in beet roots on May 23 at Philadelphia in stores from Dutch East Indies. Plantains arriving from Cuba by sea train during May were found to be infected by *Stachylidium theobromae* Turc. when inspected at New York. *Vermicularia dematium* (Pers.) Fr. was intercepted on April 23 at Galveston on peppers from Cuba.

DOMESTIC PLANT QUARANTINES

The grasshopper situation.--At the close of May the aggregate hatch of all species of grasshoppers was 90-percent complete in Texas and ranged to 75-percent complete in North Dakota. Active control was begun in 2 areas by the early part of June--1 in south and east-central Texas and the other in northwestern Minnesota. The species concerned in the Texas area is the differential grasshopper (*Melanoplus differentialis* Thos.).

The populations are restricted to bottom-land areas along creeks and rivers and the damage ranges from complete destruction of isolated cotton and cornfields to slight marginal injury. Sixty-five tons of bran have been shipped for bait purposes to the above area. The State leader reports that economically important infestations are expected to develop in at least 12 additional counties in that area. In northern Minnesota heavy populations of M. bivittatus Say have developed to the extent that over 1,000 tons of bait materials are being supplied to Polk, Kittson, and Marshall Counties.

The Mormon cricket situation.--The hatch of Mormon crickets is complete at low altitudes throughout the entire western area and adults are present in Washington, Oregon, and Idaho. At higher altitudes eggs were still hatching in the early part of June. In Oregon control work has been retarded because of cool and unsettled weather. Rank vegetation on the range and in marginal areas is holding the crickets out of cropland. Extensive strip baiting is in progress in Baker County and baiting is continued in the Warm Springs area by use of airplane and ground spreaders. Throughout the infested portion of Nevada, although frequent showers and cool weather have slowed up control activities, there has been a general increase in the use of bait and good results are being obtained. All the working units are well organized and ready to meet any heavy migration that may occur.

Control of armyworms and army cutworms.--Control operations against the army cutworm (Chorizagrotis auxiliaris (Grote)) have been carried out during the current season in Kansas, Colorado, Nebraska, and Utah with good results and with a minimum of damage to crops. The outbreak was not extremely serious, except in certain localized areas, and only small quantities of grasshopper bait were needed to cope with the infestations. A new and far more serious outbreak of the armyworm (Cirphis unipuncta (Haw.)) has occurred in southwestern Oklahoma and adjacent area in Texas. The most heavily infested Oklahoma counties were Harmon, Jackson, Tillman, and Cotton, with more moderate infestations extending across the State north to Major County and east to Kingfisher and Grady Counties. Damage in the most heavily infested areas had practically ceased, however, by the early part of June and approximately 98 percent of the worms had pupated. Damage was still occurring in the more northern area, where pupation was only 50- to 70-percent complete. Sufficient bait materials are on hand in all Oklahoma counties to meet control needs; however, owing to unfavorable weather conditions and the fact that the armyworms are scattered throughout the fields of rank-growing wheat and barley, only a small percentage of the farmers in the infested areas have spread bait. Excellent results, some as high as a 100-percent kill, have been obtained where bait was used. Carabid larvae, averaging as high as 10 per square yard in some fields, are taking a heavy toll of the armyworms. In Texas heavy infestations were found in Hardeman, Wilbarger, Foard, and Childress Counties. More recently the outbreak seems to be spreading west as far as Swisher and Hale Counties and south as far as Runnels County. In Wilbarger, Hardeman, and Foard Counties populations have diminished considerably with the pupation of the larvae. By the close of May, mixing stations were in operation in 24 Texas counties. Six commercial airplanes have been employed by local interests, spreading bait in wheatfields in Floyd, Swisher, and Briscoe Counties. Parasites and predators of the armyworm have become numerous in many fields, especially those of earliest infestation.

Chinch bug survey in Oklahoma.--Spotted infestations of chinch bug were found as the result of a survey made in northeastern Oklahoma on May 26 to 30 by the State leader. Localized areas were found to be heavily infested and, unless rain or other weather conditions unfavorable to the chinch bug occur, control measures will be necessary. Arrangements have been completed for the shipping of creosote oil to the infested counties in that State if needed. One hundred chinch bugs per linear foot of drill row were found in Rogers, Osage, Craig, Ottawa, Mayes, and Muskogee Counties. The chinch bug infestations in other infested States cannot be definitely determined at this time, but it appears that little, if any, damage will occur in South Dakota or Ohio.

White-fringed beetle control methods tried on different types of area.--Several applications of dusting, spraying, clean-cultivation, and the use of herbicides have been made on each of 5 areas of isolated infestations of the white-fringed beetle on which an attempt is being made to determine the effectiveness of different methods with eradication as the objective. Each area is chosen because it represents a different type and a different problem of control. The 5 areas are described as follows: (1) An area where there is complete control of all land that is capable of cultivation and on which no crops whatever are grown. (2) An area that is under full crop operation on the part of the farmers. (3) An area of waste and abandoned lands, including many railroad tracks and industrial sites. (4) Area that is a wholly waste and abandoned expanse, with no cultivation and no inhabitants. (5) A closely built-up section in a town. W. P. A. laborers assisted with the work in the Alabama areas. The extremely dry weather prevailing throughout the infested areas practically all of May enabled the crews to put in full time and provided favorable conditions for control operations. All of the treated areas were placed in excellent condition to meet beetle emergence. The first adult Pantomorus leucoloma Boh. of the season was reported from New Orleans on May 13; the first from the Florala, Ala., area on May 22; and 47 adult beetles were collected at Carriere, Miss., on May 28-29. Establishments dealing in restricted articles in the various areas were contacted in May by regulatory inspectors relative to the seasonal quarantine restrictions, which again became effective on June 1.

Louisiana Horticultural Association favors white-fringed beetle control.--At a meeting of the Louisiana State Horticultural Association held at Baton Rouge on May 20 a resolution was passed that all State agencies give full cooperation in the suppression of the white-fringed beetle to the end that damage by the beetle and the restrictions of regulatory measures as imposed by the Federal Government may be limited to the infested areas.

Sweetpotato weevil found on wild host plant of significance.--Larvae identified as Cylas formicarius F., were recently found on Ipomoea pandurata L., in Pearl River County, Miss. It has been the opinion that in the areas off the coast such as the above county this upland species of wild morning-glory would die in the winter and therefore fail to carry the weevils over the winter. More information is needed on the possibility of weevils overwintering on native host plants in areas away from the coast, and the control unit is working with the research unit at Sunset, La., in an attempt to obtain further data relative to the problem.

Infested sweetpotatoes intercepted.--Inspectors of the Mississippi State Plant Board have made several interceptions of sweetpotatoes, trucked in violation of the Mississippi State quarantine from points in another State where sweetpotato weevil infestations exist. In one instance the driver of the truck was arrested, tried, and fined.

Peach nursery and orchard inspections.--The most active phase of phony peach and peach mosaic work was directed toward the inspection of nurseries in the mosaic area. This work was completed by May 15, with the exception of a very few small nurseries whose sales are generally local. Excellent cooperation was obtained in the removal of diseased trees in the nursery environs throughout the area. Following the nursery-inspection work, efforts were directed, to the limit of available personnel and funds, to the inspection of orchards in the mosaic-infected area and to the removal of diseased trees with the assistance of W. P. A. laborers.

The peach mosaic situation in California and Colorado.--In California a substantial reduction in the incidence of new cases of peach mosaic is reported in some counties. To the close of May no mosaic was found in Orange County, while in Riverside and San Diego Counties this year's inspection shows a marked reduction in the number of diseased trees. The cooperation of growers has been good. In Mesa County, Colo., extremely careful inspection has resulted in the finding of a slightly increased percentage of mosaic infection over last year, with 6,203 infected trees reported up to May 31. The cooperation of growers has been uniformly satisfactory, with the exception of 1 or 2, and it is anticipated that the trees on these properties will be removed shortly. The removal of diseased trees has been prosecuted as rapidly as availability of labor permitted.

Transit inspection.--Because of the seasonal decline of nursery-stock shipments, transit inspection activities were suspended at Kansas City on May 17, at Omaha and Council Bluffs on May 29, and Houston, Dallas, Memphis, and Atlanta on June 1. Work at the Detroit station, which has been manned several months by a Michigan inspector collaborating with the Bureau, was discontinued on May 14. Approximately 257 violations of Federal domestic plant quarantines were intercepted in May. A shipment of five-needle pines infested with pine needle scale (*Chionaspis pinifoliae* Fitch), caught at St. Paul, was returned to the consignor by a Minnesota State inspector under State authority. A shipment containing currant bushes labeled "silver lace vine" was intercepted at Pittsburgh. The shipment was moving into the State of Pennsylvania without the required control-area permit. The inspector at Boston recovered a specimen of a coleopterous adult, which was identified as belonging to the genus *Paria*, on a strawberry plant.

INSECTICIDE INVESTIGATIONS

Preparation of pure phenothiazine.--Purification of phenothiazine and the accurate determination of the freezing point of this compound has recently been done by L. E. Smith and O. A. Nelson. The melting point of 180°-181° C., as recorded in the literature and in chemical handbooks, was shown to be too low. Purification by repeated crystallizations followed by sublimation under carefully controlled conditions yielded a product of highest purity. This compound had a freezing point of 185.11 ± .02° C. This freezing point (or melting point) is suggested as one criterion for the purity of phenothiazine. This degree of purity could not be attained by repeated crystallizations only.

Improved method for determining molecular weights.--In connection with chemical work on new compounds, including natural products having promise as insecticides, it is essential to determine molecular weights accurately. While there are numerous methods for doing this, it happened that for various reasons in the case of one series of substances all available methods failed. In order to meet this contingency a little-known procedure outlined by Signer about 11 years ago was critically studied by E. P. Clark, of this Division, in the hope that it could be employed. The information thus gained led to a procedure of general application that is far more accurate and reliable than any other procedure available. By its use the difficulties in the insecticidal problem at hand were overcome and the method, which is to be published soon, will undoubtedly be extensively used in other lines of organic chemical research. The procedure, involving the principle of isothermal distillation and using micro quantities, is capable of distinguishing with certainty a C_{30} from a C_{31} compound.

Some "paris greens" are not paris green.--In the last 2 years R. H. Carter and C. M. Smith have come across five samples of insecticidal materials sold as paris green which were definitely not copper acetoarsenite $Cu(C_2H_3O_2)_2.3Cu(AsO_2)_2$. Two of them were probably simple copper metaarsenite $CU(AsO_2)_2.H_2O$, the others indefinite mixtures of copper arsenite and copper arsenate such as are formed when paris green is treated with alkaline media. These products may be satisfactory or even superior insecticides, but entomologists should be careful not to ascribe results obtained with them to paris green.

BEE CULTURE

Honeybees collecting nectar and pollen from grapevines.--Geo. H. Vansell, Davis, Calif., reports: "Large loads of yellow- to orange-colored pollen are taken from the grape. In some cases several bees at one time were observed on individual vines. Many of the bees had partial loads of nectar with a sugar concentration of 65 to 75 percent. The plants are visited throughout the day, but most heavily during the morning hours. There is a ring-like, orange-colored area about the base of each tiny grape berry which is presumably nectary tissue. The grape, as these observations reveal, must be pollinated considerably by the honeybee, as both nectar and pollen are collected. It is estimated that 65,600 bees were working on a 40-acre field at 7:30 a. m., on May 22, 1941. This is on a basis of 6 bees observed on a trellised vine covering 100 square feet. Some flies and other insects were also seeking nectar."

Honeybees select older blossoms on orange.--In connection with the fact that bees do not gather nectar the sugar concentration of which is too low to suit their taste, Mr. Vansell has found that in the case of orange blossoms the sugar concentration is not sufficient to draw the honeybee until the flowers have aged somewhat. He states: "Orange-blossom buds begin to secrete nectar before the petals open and continue after their unfolding for at least 48 hours. The life of an individual blossom is about 1 week, after which time the petals and anthers shatter away. The bud nectar has an average sugar concentration of about 14-15 percent, but at this concentration the nectar is not attractive to bees, especially in the presence of the more concentrated nectar secreted by mustard and oxalis blossoms. By exposure to dry air or wind, the water from orange nectar is evaporated. This results in the older blossoms having nectar of higher sugar concentration. When the concentration approaches 30 percent the bees begin to collect it for storage. This season, on April 9 at 9:30 a. m., at Santa Ana, Calif., the sugar concentration of nectar from buds, freshly opened and old blossoms, and from bees were ascertained by refractometer method. The average concentration values are as follows: Closed buds, 13.8 percent; buds with 1-2 petals open, 15.7 percent; recently opened blossoms, 20.3 percent; old, shattering blossoms, 30.8 percent; honeybee stomachs, 31.9 percent.

Infection of queen bees with Nosema spores may be important cause of premature supersedure.--C. L. Farrar, Madison, Wis., reports: "Southern queens used in stock-testing studies have been superseded in larger numbers in 1940 and 1941. Difference in the quality of lines of stock has been recognized as a major factor in queen supersedure, yet in the last two seasons, a number of queens from lines showing good performance have superseded in a peculiar manner. Two queens which recently stopped laying were examined and found heavily infested with spores of the protozoan *Nosema apis*. In checking back through the colony records for the last two seasons the behavior of the queens, the breaking in the brood cycle, and subsequent supersedure show a close similarity with the record for the two queens found infected. *Nosema* was found in better than 15 percent of the laboratory's overwintered colonies, and the percentage with a light infection was probably considerably greater. Feeding experiments conducted under greenhouse conditions have shown that, where the worker population is infected, brood rearing is not normal, regardless of food conditions. Packages this spring have reared less brood and of poorer quality than packages studied in previous years, yet the season has been exceptionally favorable for pollen and the colony populations have been normal. Circumstantial evidence suggests that *Nosema* may have been a limiting factor. Overwintered colonies have reared exceptionally good brood and are strong. Queen infection appears to be a matter of chance since some colonies heavily infected last winter maintained healthy queens, while other queens became infected."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Busck returns from Hawaii.--August Busck returned in April from Honolulu. He had spent the previous 6 months at the Bernice P. Bishop Museum studying the Microlepidoptera of Hawaii. The trip was made under a Yale University-Bishop Museum Fellowship, with the object of undertaking a classification of the Hawaiian Microlepidoptera. Mr. Busck brought back with him some 300 wing and genitalia slides, made during his studies in Honolulu, as well as numerous undissected specimens for further study here, and in addition the entire Microlepidoptera collections of O. H. Swezey and E. C. Zimmerman, made in Samoa last year. These collections contain numerous good series of reared species. They will be worked up when the report on the Hawaiian species is completed. Mr. Busck has the privilege of retaining, for the National Collection, a proper share of the Samoan material, including paratypes of any new species he may describe.

Response of flies to certain vibrations.--Vibrations or sounds of certain pitch apparently attract Coelopa frigida (F.). This is a common acalypterate muscid fly which is supposed to breed in seaweed along the Atlantic coast. Heretofore the species has been considered innoxious. A long series of specimens of both sexes, collected by Harry F. Dietz, of the Grasselli Chemical Department, E. I. duPont de Nemours & Company, Wilmington, Del., was forwarded to this Division with the information given below. The following observations are of considerable zoological interest and may have an economic bearing under certain circumstances. "One of the important features in these two infestations (in Massachusetts) is that the flies were attracted to these (dry) cleaning establishments in large numbers only when certain types of vibrating machinery were in operation. When this machinery was not in operation those flies that had collected would disperse. Consequently, it appears that they had been attracted to these plants, not by the odor of the cleaner fluids used, but by a certain type of vibration or sound of certain pitch. The cleaning fluid was a very generally employed chlorinated ethylene compound. The flies were not attracted to the exhaust from which fumes were emanating. In the drying chambers such flies as came in contact with the concentrated fumes were knocked down immediately and killed. From the point of view of the cleaners, this collection of flies in their places of business, irrespective of the reason, is a serious menace, because of its psychological effect on customers." (Quoted from Mr. Dietz's letter.)

Myrmica aldrichi Wheeler recovered.--In a collection of ants determined recently for the Department of Entomology, Oregon State College, there were specimens of M. aldrichi from Mount Hood. So far as known, these represent the only individuals of the species, other than the cotypes.

Valuable additions to collection of bees.--During the last 6 months T. D. A. Cockerell, of the University of Colorado, has sent in several very valuable lots of bees. The material consists of types of approximately 300 species, described by Prof. Cockerell, and 600 additional species determined by him. Most of them are from Australia and Siberia, the remainder from Africa, Asia, and the Americas. This material constitutes an invaluable contribution to the collection at the National Museum, as

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more than half the species were heretofore not represented in the identified bee collection.

Rearing of pine sawflies attempted.--In 1817 Leach described four species of the pine-feeding sawfly genus Neodiprion from specimens collected near Savannah, Ga., by John Abbot. The identity of these species has remained uncertain and at least one of the names has been misapplied to the white pine sawfly. In the hope of obtaining material which would aid in making more satisfactory identifications of these species, R. A. Cushman and H. W. Capps visited Savannah and other points with similar flora along the Atlantic coast. Many colonies of larvae were collected from various species of pine. The material is being reared at West Point, Va., by L. A. Hetrick, a collaborator of the Bureau, stationed at the Virginia Agricultural Experiment Station. The result of the attempted association of names and species will not be known until the adults have been reared and the species studied.

Type material of the genus Cryptus added to the collection.--Harry D. Pratt, a graduate student at the University of Minnesota, has recently returned to the National Museum material of the ichneumonid genus Cryptus. He borrowed the material for a study in connection with the preparation of a revision of the North American species of the genus. In addition to the several hundred specimens of the old species, the material includes type specimens of 20 of the 31 new species to be described, 19 represented by the holotypes.

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